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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/820,376	03/27/2001	Johji Tajima	Q63734	5691

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2100 Pennsylvania Avenue, N.W.
Washington, DC 20037

EXAMINER

KIM, CHONG R

ART UNIT PAPER NUMBER

2623

DATE MAILED: 01/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/820,376

Applicant(s)

TAJIMA, JOHJI

Examiner

Charles Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/17/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment and Arguments

1. Applicant's amendment filed on July 1, 2004 has been entered and made of record.
2. In view of applicant's amendment, the claim objections are withdrawn.
3. In view of applicant's amendment, the 112 second paragraph rejections are withdrawn.
4. Applicant's arguments have been fully considered, but they are not deemed to be persuasive for at least the following reasons.

Applicants argue (page 19) that their claimed invention (claims 1-14, 19, 21-25) differs from the prior art because "the references fail to disclose or suggest at least the following limitations of the independent claims: generating referential face image data based on the shooting conditions, the three dimensional shape and an image of the surface thereof".

Applicants also argue that "Nagamine on the other hand discloses the collation of three-dimensional shapes, but does not use the surface image. As such, Nagamine compares shapes, but not face images." The Examiner disagrees. Nagamine discloses the generation of referential face image data based on a three-dimensional shape of a person's face and an image of the surface thereof on pages 324-325. For example, Nagamine states that "the 3-D range data on the face surface is considered as the input" (section 2). Nagamine illustrates the generated referential face image data in figure 1. It can be clearly seen that the referential face image data is generated based on a three-dimensional shape of a person's face and an image of the surface thereof. The Examiner further disagrees with the applicant's argument that Nagamine compares shapes, but not face images. Nagamine clearly states that his work "deals with the 3D facial

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identification approach” (page 324, section 2). In other words, 3D enquiry face image data is compared to 3D referential face image data. Although the details of Nagamine’s comparison process might deal with the sections (“shapes”) of the 3D face image data, the Examiner notes that Nagamine was not relied upon to teach the details of the comparison process--Nagamine was relied upon to teach that the referential face image data is generated based on three-dimensional shape and a surface image of the person’s face. Therefore, the combination of Beymer and Nagamine appears to still be applicable to claims 1-14, 19, 21-25.

Applicants further argue (page 19) that “Beymer does not take into account the lighting directions because it assumes lighting conditions are fixed.” The Examiner disagrees. The Examiner notes that the lighting configuration of the “60 watt lamp near the camera supplemented by background lighting from windows and overhead lights” will inherently provide a specific lighting direction. Therefore, it appears that Beymer does take into account the lighting direction because he maintains the lighting configuration described above in order to provide the specific lighting direction for each image capturing process.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1-14, 19, 21-34, 40, 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of the article entitled "Face Recognition Under Varying Pose" by Beymer ("Beymer") and the article entitled "3D Facial Image Analysis for Human Identification" by Nagamine et al., ("Nagamine").

Referring to claim 1, Beymer discloses a face recognition method for identifying a person by detecting a surface image of a person's face and collating the surface image with enquiry face image data, comprising:

- a. estimating shooting conditions (pose) of the enquiry face image data (page 759, section 4.2);
- b. generating referential face image data based on the shooting conditions the image of the surface of a person's face (page 758-759, sections 4.1 and 4.2);
- c. comparing the referential face image data to the enquiry face image data (page 759, section 4.2);
- d. identifying the person of the enquiry face image data with the person of the referential face image data based on a difference between the face image data (page 759, section 4.2).

Beymer does not explicitly disclose that the referential face image data is generated using a three-dimensional shape of a person's face. However, this feature was exceedingly well known in the art. For example, Nagamine discloses a referential face (sample set) image data that is generated using a three-dimensional shape of a person's face and an image of the surface thereof (page 325, sections 4 and 5, and figure 1).

Beymer and Nagamine are both concerned with face recognition techniques. Nagamine's referential face image data provides distinguishing surface features that are robust against changes in makeup and lighting, and thereby enhances the facial recognition process (Nagamine, page 324, abstract). Therefore, it would have been obvious to modify the referential face image data of Beymer so that it is generated by the three-dimensional shape of a person's face, as taught by Nagamine, in order to enhance the facial recognition process.

Referring to claim 2, Beymer discloses a face recognition method having a database which stores surface images of human faces for identifying a person by collating the surface image stored in the database with enquiry face image data, comprising:

- a. estimating shooting conditions (pose) of the enquiry face image data (page 759, section 4.2);
- b.; generating referential face image data based on the shooting conditions and the surface image stored in the database (library) using a graphics means (page 758-759, sections 4.1 and 4.2);
- c. comparing the referential face image data to the enquiry face image data (page 759, section 4.2);
- d. identifying the person of the enquiry face image data with the person of the referential face image data based on a difference between the face image data (page 759, section 4.2).

Beymer does not explicitly disclose that the referential face image data is generated using a three-dimensional shape of a person's face stored in a database. However, this feature was exceedingly well known in the art. For example, Nagamine discloses a referential face (sample

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set) image data that is generated using a three-dimensional shape of a person's face and a surface image stored in a database (page 325, sections 4 and 5, and figure 1).

Beymer and Nagamine are both concerned with face recognition techniques. Nagamine's referential face image data provides distinguishing surface features that are robust against changes in makeup and lighting, and thereby enhances the facial recognition process (Nagamine, page 324, abstract). Therefore, it would have been obvious to modify the referential face image data of Beymer so that it is generated by the three-dimensional shape of a person's face, as taught by Nagamine, in order to enhance the facial recognition process.

Referring to claim 3, Beymer further discloses that the shooting conditions comprise an angle of the face image and lighting directions (page 757, section 2, right column and page 759, section 4.2).

Nagamine further discloses that the three-dimensional shape is specified by shape data (page 325, section 5), but does not explicitly disclose that the three dimensional shape is specified by color image data. However, Official notice is taken that color image data was exceedingly well known in the art. Therefore, it would have been obvious to specify the three-dimensional shape by color image data in order to provide additional distinguishing properties of the image data, thereby enhancing the face recognition process.

Referring to claim 4, see the rejection of at least claim 3 above.

Referring to claim 5, Beymer further discloses that the referential face image and the enquiry face image are compared after locations of characteristic points, size and brightness of both the face image data have been normalized (pages 758-759, sections 4.1 and 4.2).

Referring to claim 6, see the rejection of at least claim 5 above.

Referring to claim 7, Beymer further discloses that the referential face image and the enquiry face image are compared after locations of characteristic points, size and brightness of both the face image data have been normalized as parameters (pages 758-759, sections 4.1 and 4.2).

Referring to claim 8, see the rejection of at least claim 7 above.

Referring to claim 9, see the rejection of at least claim 1 above.

Referring to claim 10, see the rejection of at least claim 2 above.

Referring to claim 11, see the rejection of at least claim 1 above. Beymer further discloses an image input means for obtaining the enquiry face image (page 759, section 4.2).

Referring to claim 12, see the rejection of at least claim 2 above. Beymer further discloses an image input means for obtaining the enquiry face image data (page 759, section 4.2).

Referring to claims 13 and 14, Beymer and Nagamine do not explicitly disclose that the surface image is a color image. However, Official notice is taken that color image data was exceedingly well known in the art. Therefore, it would have been obvious to modify the surface image of Beymer and Nagamine so that it is a color image, in order to provide additional distinguishing properties of the image data, thereby enhancing the face recognition process.

Referring to claim 19, see the rejection of at least claim 10 above. Beymer further discloses an image input means for obtaining the enquiry image data (page 759, section 4.2).

Referring to claim 21, see the rejection of at least claim 2 above.

Referring to claim 22, see the rejection of at least claim 3 above.

Referring to claim 23, see the rejection of at least claim 19 above.

Referring to claim 24, see the rejection of at least claim 3 above.

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Referring to claim 25, see the rejection of at least claim 9 above.

Referring to claim 26, Beymer further discloses that the referential face image data is generated by using a graphics means (pages 758-759, section 4.1).

Referring to claims 27-32, see the rejection of at least claim 26 above.

Referring to claim 33, Beymer further discloses that the shooting conditions comprise a plurality of lighting directions (page 757, right column. Note that the “60 watt lamp near the camera supplemented by background lighting from windows and overhead lights” provides a plurality of lighting directions).

Referring to claims 34, 40, 41, see the rejection of at least claim 33 above.

6. Claims 15-18, 20, 35-39, 42-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of the article entitled “Face Recognition Under Varying Pose” by Beymer (“Beymer”) and the article entitled “3D Facial Image Analysis for Human Identification” by Nagamine et al., (“Nagamine”), further in view of Wang et al., U.S. Patent No. 6,035,055 (“Wang”).

Referring to claim 15, see the discussion of at least claim 3 above. Beymer further discloses a normalizing means for normalizing the referential face image data and the enquiry face image data respectively, and an image comparing means for comparing outputs of the normalizing means that comprise a normalized enquiry image and a normalized referential color image (pages 758-759, sections 4.1 and 4.2).

Beymer and Nagamine do not explicitly disclose that the referential face image data and the enquiry face image data are normalized using a standard face image as the basis. However,

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this feature was exceedingly well known in the art. For example, Wang discloses a means for normalizing face image data using a standard face image as the basis (col. 10, lines 10-17).

Beymer, Nagamine, and Wang are all concerned with face recognition techniques. Wang enhances the face recognition process by providing an effective and efficient search and retrieval of the face images (Wang, col. 2, lines 15-19). Therefore, it would have been obvious to modify the normalizing step of Beymer and Nagamine, so that the referential face image data and the enquiry face image data are normalized using a standard face image as the basis, as taught by Wang, in order to enhance the face recognition process.

Referring to claims 16-18, 20, see the rejection of at least claim 15 above.

Referring to claims 35-39, see the rejection of at least claim 33 above.

Referring to claim 42, Beymer further discloses that the normalizing means normalizes the location of characteristic points (eyes), size (scaling) and brightness (preprocessing to introduce invariance to lighting conditions) of both the referential face image data and the enquiry face image data (pages 758-759, sections 4.1 and 4.2).

Referring to claims 43-45, see the rejection of at least claim 42 above.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 703-306-4038. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ck
January 18, 2005


Jon Chang
Primary Examiner